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Is a reading of



Overview

How to Use an Optical Power Meter Correctly | ShopFiberOpticUse a PON-specific meter such as the XGS/GPON Power Meter or 25G PON Power Meter. A basic meter.

Key Takeaways

For most fiber optic systems, an optical power meter reading is considered acceptable when the received power is between approximately -25 dBm and -3 dBm, depending on the system and equipment used.Understanding Optical Power Measurements

Optical power meters measure the absolute power of light in a fiber, typically expressed in dBm, which is a logarithmic scale referenced to 1 milliwatt. Positive dBm values indicate power greater than 1 mW, while negative values indicate power less than 1 mW. For example, -10 dBm corresponds to one-tenth of a milliwatt, and -20 dBm corresponds to one-hundredth of a milliwatt . The meter can also display dB, which represents relative power loss compared to a reference. Loss measurements are usually negative, while power measurements can be positive or negative depending on the source and distance .

Typical Acceptable Ranges
• Residential fiber systems (FTTx, GPON, EPON):
• Ideal/Excellent: -15 dBm to -22 dBm

• Acceptable/Warning: -25 dBm to -28 dBm

• Poor/Trouble: below -28 dBm, which may cause intermittent service or signal failure

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• Maximum safe input: Around -3 dBm to 0 dBm. Exceeding this can saturate the receiver or, in rare cases, damage the photodiode .

• Source power ranges: Lasers typically output 0 to -10 dBm, while LEDs output -10 to -20 dBm. High-power lasers for CATV or long-haul systems can reach +20 dBm, which is significantly higher than typical residential levels .
Practical Considerations
• Wavelength Matching: The power meter must be set to the same wavelength as the transmitted signal (commonly 850, 1300, or 1550 nm) to ensure accurate readings .

• Measurement Point: Readings differ depending on whether you measure at the transmitter, patch panel, or customer outlet. Always compare measurements at the same point for meaningful results .

• Link Budget: Acceptable readings depend on the system's design, including fiber length, splitters, and connector losses. A reading within the acceptable range ensures the receiver operates with a healthy margin .

• Attenuation: If the optical power is too high, a passive optical attenuator may be required to reduce the signal to a safe level .
Summary

An optical power meter reading is acceptable when the received power is within the system's operational range, typically -25 dBm to -3 dBm for most residential and commercial fiber networks. Readings below this range indicate potential signal degradation, while readings above the maximum threshold may risk receiver saturation. Proper calibration, wavelength matching, and reference point selection are essential for accurate and meaningful measurements .

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